



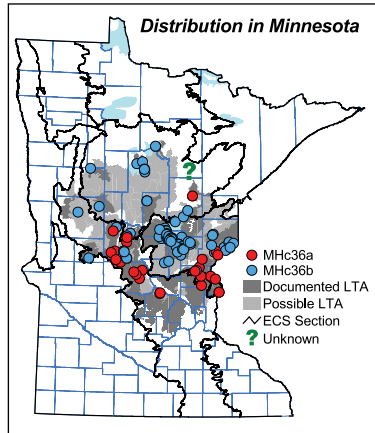
## Central Mesic Hardwood Forest (Eastern)

Mesic hardwood forests dominated by basswood, northern red oak, and sugar maple. Present on loamy or sandy loam soils on hummocky stagnation moraines and rolling till plains.

### Vegetation Structure & Composition

Description is based on summary of vegetation data from 129 plots (relevés).

- **Ground-layer** cover ranges from patchy to interrupted (25–75%). Common species include early meadow-rue (*Thalictrum dioicum*), lady fern (*Athyrium filix-femina*), large-flowered bellwort (*Uvularia grandiflora*), Clayton's sweet cicely (*Osmorhiza claytonii*), Pennsylvania sedge (*Carex pennsylvanica*), large-leaved aster (*Aster macrophyllus*), wild sarsaparilla (*Aralia nudicaulis*), zigzag goldenrod (*Solidago flexicaulis*), and yellow violet (*Viola pubescens*).
- **Shrub-layer** cover is variable; important species include chokecherry (*Prunus virginiana*), pagoda dogwood (*Cornus alternifolia*), prickly gooseberry (*Ribes cynosbati*), and beaked hazelnut (*Corylus cornuta*), along with sugar maple, basswood, ironwood, and northern red oak seedlings and saplings.
- **Subcanopy** cover is variable; sugar maple is the most important species, followed by ironwood and basswood.
- **Canopy** is continuous (> 75% cover), usually dominated by basswood, northern red oak, and sugar maple. Minor canopy species include green ash, paper birch, bur oak, red maple, and quaking aspen.



### Landscape Setting & Soils

- **Stagnation moraines**—Common. Landscape is hummocky with highly variable relief. Parent material is predominantly noncalcareous or weakly calcareous fine-textured till, often with a shallow cap of coarser, partially sorted drift. Soils have firm, sandy clay-loam subsoil horizons capable of perching snowmelt and rainfall well above the local water table. On upper slopes, soils do not perch water for long and are well drained with a fresh soil-moisture regime. On lower slopes, soils can perch water for prolonged periods and are moderately well drained with a very fresh or moderately moist soil-moisture regime. (MDL; WSU; Hardwood Hills and Big Woods in MIM)
- **Till plains**—Occasional. Landscape is undulating to rolling. Parent material is noncalcareous gravelly, sandy-loam till. Soils have very firm and partially cemented lower horizons capable of perching snowmelt and rainfall. Gray soil colors just above the lower horizons indicate a thin (~10in [25cm]) zone of saturated soil that persists well into the growing season. Soils are well drained to moderately well drained. Soil-moisture regime is fresh or moderately moist. (MDL; WSU)

### Natural History

In the past, catastrophic disturbances were rare in MHc36. An analysis of Public Land Survey (PLS) records indicates that the rotation of catastrophic fires was in excess of 1,000 years, and the rotation of catastrophic windthrow was about 380 years. Events that result in partial loss of the tree canopy, especially light surface fires, were much more common, with an estimated rotation of just 40 years. Based on the historic composition and age structure of these forests, MHc36 had two growth stages separated by a long period of transition.

- **0–35 years**—Young forests recovering from wind, dominated by northern red oak mixed with some quaking aspen, big-toothed aspen, and basswood.



• **35–95 years**—A transition period marked by a steady decline in northern red oak and its replacement with sugar maple. Quaking aspen, big-toothed aspen, and paper birch decline to the point where they are very rare, while basswood, American elm, and ironwood increase. Bur oak and white pine become established in the understory during this period.

• **> 95 years**—Mature forests characterized by canopies of sugar maple mixed with many other trees including basswood, American elm, northern red oak, ironwood, and minor amounts of bur oak and white pine. (Modern mature forests contain more green ash and red maple than indicated in the PLS records.)

### Similar Native Plant Community Classes

#### • MHc37 Central Mesic Hardwood Forest (Western)

MHc37 is similar to MHc36 but generally occurs to the west of MHc36, in the western part of the MDL and in the Hardwood Hills Subsection in the MIM. In general, MHc37 is considerably poorer in species than MHc36.

| MHc36 Indicator Species                                  | (freq%) |       | MHc37 Indicator Species                         | (freq%) |       |
|--|---------|-------|---|---------|-------|
|  | MHc36   | MHc37 |   | MHc36   | MHc37 |
| Blue beech (U)   | 40      | -     | Canada goldenrod ( <i>Solidago canadensis</i> ) | 1       | 12    |
| Maidenhair fern ( <i>Adiantum pedatum</i> )              | 26      | -     | Box elder (U)                                   | 1       | 8     |
| Wild geranium ( <i>Geranium maculatum</i> )              | 52      | 1     | Tall coneflower ( <i>Rudbeckia laciniata</i> )  | 4       | 22    |
| Interrupted fern ( <i>Osmunda claytoniana</i> )          | 45      | 1     | Round-leaved dogwood ( <i>Cornus rugosa</i> )   | 5       | 17    |
| Nodding fescue ( <i>Festuca subverticillata</i> )        | 47      | 2     | American hazelnut ( <i>Corylus americana</i> )  | 12      | 37    |
| Bearded shorthusk ( <i>Brachyelytrum erectum</i> )       | 41      | 5     | American elm (C,U)                              | 25      | 73    |
| Large-flowered trillium ( <i>Trillium grandiflorum</i> ) | 52      | 7     | Quaking aspen (C)                               | 20      | 47    |
| Red maple (C,U)  | 50      | 7     | Paper birch (C)                                 | 31      | 65    |

#### • MHc26 Central Dry-Mesic Oak-Aspen Forest

MHc26 is similar to MHc36 but usually occurs on drier sites.

| MHc36 Indicator Species                                     | (freq%) |       | MHc26 Indicator Species                                | (freq%) |       |
|---|---------|-------|--|---------|-------|
|   | MHc36   | MHc26 |  | MHc36   | MHc26 |
| Blue cohosh ( <i>Caulophyllum thalictroides</i> )           | 39      | 3     | Lowbush blueberry ( <i>Vaccinium angustifolium</i> )   | 2       | 43    |
| Maidenhair fern ( <i>Adiantum pedatum</i> )                 | 26      | 3     | Prickly or Smooth wild rose*                           | 2       | 17    |
| Wild ginger ( <i>Asarum canadense</i> )                     | 36      | 4     | Round-leaved dogwood ( <i>Cornus rugosa</i> )          | 5       | 41    |
| Bloodroot ( <i>Sanguinaria canadensis</i> )                 | 58      | 7     | Hairy honeysuckle ( <i>Lonicera hirsuta</i> )          | 5       | 24    |
| Jack-in-the-pulpit ( <i>Arisaema triphyllum</i> )           | 50      | 8     | Bush honeysuckle ( <i>Diervilla lonicera</i> )         | 16      | 65    |
| Lopseed ( <i>Phryma leptostachya</i> )                      | 50      | 9     | Veiny pea ( <i>Lathyrus venosus</i> )                  | 9       | 29    |
| Common enchanters's nightshade ( <i>Circaea lutetiana</i> ) | 57      | 13    | Tall blackberries**                                    | 9       | 27    |
| Wild geranium ( <i>Geranium maculatum</i> )                 | 52      | 13    | Spreading dogbane ( <i>Apocynum androsaemifolium</i> ) | 10      | 31    |

\* Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*) \*\* Tall blackberries (*Rubus allegheniensis* and similar *Rubus* spp.)

#### • FDs37 Southern Dry-Mesic Oak (Maple) Woodland

FDs37 when dominated by northern red oak can be appear similar to MHc36 but generally lacks sugar maple.

| MHc36 Indicator Species                                  | (freq%) |       | FDs37 Indicator Species                        | (freq%) |       |
|--|---------|-------|--|---------|-------|
|  | MHc36   | FDs37 |  | MHc36   | FDs37 |
| Leatherwood ( <i>Dicra palustris</i> )                   | 38      | -     | Northern pin oak (C,U)                         | 1       | 35    |
| Zigzag goldenrod ( <i>Solidago flexicaulis</i> )         | 79      | 4     | Prickly or Smooth wild rose*                   | 2       | 27    |
| Long-stalked sedge ( <i>Carex pedunculata</i> )          | 53      | 4     | Nannyberry ( <i>Viburnum lentago</i> )         | 4       | 46    |
| Large-flowered trillium ( <i>Trillium grandiflorum</i> ) | 52      | 4     | Black cherry (C)                               | 4       | 38    |
| Sugar maple (C,U)  | 91      | 8     | Gray dogwood ( <i>Cornus racemosa</i> )        | 7       | 62    |
| Basswood (C)   | 87      | 8     | Tall blackberries**                            | 9       | 73    |
| Blue beech (U)   | 40      | 4     | Wild grape ( <i>Vitis riparia</i> )            | 10      | 69    |
| Bloodroot ( <i>Sanguinaria canadensis</i> )              | 58      | 8     | American hazelnut ( <i>Corylus americana</i> ) | 12      | 85    |

\* Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*) \*\* Tall blackberries (*Rubus allegheniensis* and similar *Rubus* spp.)

#### • FDs36 Southern Dry-Mesic Oak-Aspen Forest

FDs36 when dominated by northern red oak or bur oak can be similar in appearance to MHc36. FDs36 generally occurs to the west and north of MHc36 and is more likely to have species with affinity for southern forests or woodlands.

| MHc36 Indicator Species                                  | (freq%) |       | FDs36 Indicator Species                                   | (freq%) |       |
|--|---------|-------|---|---------|-------|
|  | MHc36   | FDs36 |   | MHc36   | FDs36 |
| Large-leaved aster ( <i>Aster macrophyllus</i> )         | 77      | -     | Canada goldenrod ( <i>Solidago canadensis</i> )           | 1       | 32    |
| Long-stalked sedge ( <i>Carex pedunculata</i> )          | 53      | -     | Wild plum ( <i>Prunus americana</i> )                     | 1       | 24    |
| Nodding fescue ( <i>Festuca subverticillata</i> )        | 47      | -     | Snowberry or Wolfberry*                                   | 3       | 68    |
| Blue beech (U)   | 40      | -     | Prickly or Smooth wild rose**                             | 2       | 32    |
| Wild geranium ( <i>Geranium maculatum</i> )              | 52      | 4     | Golden alexanders ( <i>Zizia aurea</i> )                  | 2       | 28    |
| Large-flowered trillium ( <i>Trillium grandiflorum</i> ) | 52      | 4     | Gray dogwood ( <i>Cornus racemosa</i> )                   | 7       | 72    |
| Jack-in-the-pulpit ( <i>Arisaema triphyllum</i> )        | 50      | 4     | Starry false Solomon's seal ( <i>Smilacina stellata</i> ) | 5       | 36    |
| Sugar maple (C,U)  | 91      | 8     | Columbine ( <i>Aquilegia canadensis</i> )                 | 7       | 40    |

\* Snowberry or Wolfberry (*Symphoricarpos albus* or *S. occidentalis*) \*\* Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*)



## • MHn35 Northern Mesic Hardwood Forest

MHn35 is similar to MHc36 but is more likely to have species most common in forests in the northern half of the state such as balsam fir, mountain maple (*Acer spicatum*), and bluebead lily (*Clintonia borealis*).

| MHc36 Indicator Species                                     | (freq%) |       |
|---|---------|-------|
|   | MHc36   | MHn35 |
| Common enchanter's nightshade ( <i>Circaea lutetiana</i> )  | 57      | 1     |
| Lopseed ( <i>Phryma leptostachya</i> )                      | 50      | 1     |
| Bitternut hickory (U)                                       | 34      | 1     |
| Wild geranium ( <i>Geranium maculatum</i> )                 | 52      | 1     |
| Bloodroot ( <i>Sanguinaria canadensis</i> )                 | 58      | 4     |
| Nodding fescue ( <i>Festuca subverticillata</i> )           | 47      | 4     |
| Blue beech (U)  | 40      | 4     |
| Pointed-leaved tick trefoil ( <i>Desmodium glutinosum</i> ) | 53      | 7     |

| MHn35 Indicator Species                       | (freq%) |       |
|---|---------|-------|
|   | MHc36   | MHn35 |
| Groundpine*                                   | -       | 36    |
| Balsam fir (U)                                | 3       | 51    |
| White spruce (U)                              | 2       | 18    |
| Bluebead lily ( <i>Clintonia borealis</i> )   | 11      | 71    |
| Hairy honeysuckle ( <i>Lonicera hirsuta</i> ) | 5       | 24    |
| Mountain maple ( <i>Acer spicatum</i> )       | 12      | 49    |
| Round-leaved dogwood ( <i>Cornus rugosa</i> ) | 5       | 18    |
| Starflower ( <i>Trientalis borealis</i> )     | 21      | 61    |

\* Groundpine (*Lycopodium dendroideum* or *L. hickeyi*)

## Native Plant Community Types in Class

### • MHc36a Red Oak - Basswood Forest (Noncalcareous Till)

Mesic hardwood (or rarely hardwood-conifer) forests most common on sites with soils derived from noncalcareous glacial till. Canopy is dominated by basswood and northern red oak, often with sugar maple. White pine, bur oak, quaking aspen, and white oak are important in the canopy on some sites. Paper birch, green ash, big-toothed aspen, and red maple are often present in the canopy but seldom abundant. Species that help to distinguish MHc36a from MHc36b include prickly ash (*Zanthoxylum americanum*) and Virginia creepers (*Parthenocissus* spp.). Although not common, red raspberry (*Rubus idaeus*), wild grape (*Vitis riparia*), white avens (*Geum canadense*), columbine (*Aquilegia canadensis*), poke milkweed (*Asclepias exaltata*), and white pine also are more likely to occur in MHc36a. MHc36a has been documented primarily in the central MIM and southern WSU. Description is based on summary of vegetation data from 33 plots.

### • MHc36b Red Oak - Basswood Forest (Calcareous Till)

Mesic hardwood forests most common on sites with soils derived from calcareous glacial till. Canopy is dominated by basswood, sugar maple, and northern red oak. Green ash, paper birch, red maple, bur oak, quaking aspen, black ash, bitternut hickory, and big-toothed aspen may also be present in the canopy. Species that help to distinguish MHc36b from MHc36a include large-flowered trillium (*Trillium grandiflorum*), rose twistedstalk (*Streptopus roseus*), interrupted fern (*Osmunda claytoniana*), bearded shorthusk (*Brachyelytrum erectum*), wild ginger (*Asarum canadense*), wild honeysuckle (*Lonicera dioica*), dwarf raspberry (*Rubus pubescens*), and pale vetchling (*Lathyrus ochroleucus*). MHc36b has been documented mainly in the WSU but also occurs in the Hardwood Hills Subsection of the MIM and occasionally in the MDL on fire-protected sites such as peninsulas and islands in large lakes. Description is based on summary of vegetation data from 96 plots.

